

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 3, 10, 33, 48 and 50 are being amended.

Claims 2 and 49 are being canceled.

New claim 51 is being added.

Claims 1, 3-10, 12-15, 33, 34, 36-42, 44-48 and 50-51 are presently pending for consideration.

Applicants' representative appreciates the courtesies extended to him by Examiner Doroshenk and Examiner Johnson, during an Examiner Interview conducted on August 26, 2003. During the interview, the main prior art references were discussed, as well as the pending claims (as proposed to be amended in a draft amendment provided to the examiners during the interview).

This amendment amends, cancels and adds claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claims remain under examination in the application, is presented, with an appropriate defined status identifier.

In the Office Action, claims 1-6, 10, 12, 13, 15 and 48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jahnke et al. (U.S. Patent 5,345,756) in view of Rice (U.S. Patent 4,571,935); claims 7 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jahnke et al. in view of Rice, and further in view of Perkins et al. (U.S. Patent 5,160,096); claims 8 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jahnke et al. in view of Rice, and further in view of Iwata et al. (U.S. Patent 5,327,718); and claims 33, 34, 36-39, 44-47, 49 and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jahnke et al. in view of Rice, and further in view of Perkins et al.; and claims 40 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jahnke et al. in view of

Rice, and further in view of Perkins et al. and further in view of Iwata et al. These rejections are traversed for at least the reasons given below.

In an IGCC system according to an embodiment of the present invention and as exemplified by claim 33, for example, when steam is not generated in a gasification cycle, the exhaust air of a gas turbine compressor is used as coolant for a gas turbine high-temperature section. Also, when steam is generated in the gasification cycle, cooling air is changed to steam, the gas turbine high-temperature section is cooled with the cooling steam supply, and the steam generated after cooling the high-temperature section of the gas turbine is recovered and is made to join a heat-exchange process of a steam turbine or an exhaust-heat recovery boiler.

Jahne, on the other hand, discloses a fundamentally different IGCC system. In Jahnke, steam generated in a gasification cycle is discharged to a combustor (steam jet). Therefore, although turbine output increases, since steam is not recovered, thermal efficiency decreases in Jahnke's system.

Rice discloses a combined-cycle-power-generation system, whereby Rice merely provides an example that adopts steam cooling of a power turbine by way of a steam turbine.

The combined teachings of Jahnke and Rice does not teach or suggest the supply of steam generated in a gasification cycle in an IGCC plant to a gas turbine combustor. The present invention enables cooling of a gas turbine high-temperature section by performing supply recovery at a gas turbine high-temperature section, whereby the heat recovery from the recovery steam is achieved by recovering the steam after the heat exchange and returning it to a steam cycle.

The present invention allows an improvement in thermal efficiency in an IGCC plant, which is a feature not capable in the combined teachings of the cited art of record.

Furthermore, the coolant stream with which Rice cools his steam turbine high-temperature section is supplied from a steam cycle, whereby Rice's system

is much different from an IGCC plant at least in this regard. Note also while Rice discloses a gas turbine 20, this component is not cooled by steam from his steam turbine 38, but rather it is his power turbine 34 that is cooled by steam from his steam turbine 38.

Still further, page 3 of the Office Action asserts that "While Jahnke et al. does disclose that said steam created in a heat exchanger in said coal gasification system is further heated by removing waste heat in another stage of the generator (C9/L11-20 and C12/L28-40), the reference does not explicitly disclose said another stage being at least one high-temperature section of the gas turbine system which is at a temperature higher than a temperature of said steam from said heat exchanger." The Office Action then relies on the teachings of Rice to show this cooling of a gas turbine using high-temperature steam.

Applicants strongly disagree with these assertions made in the Office Action. Column 9, lines 11-20 of Jahnke et al. describes that exhaust steam from an intermediate expansion turbine is reheated to a temperature of about 100 F to 250 F in a heat exchanger, and then recycled to the HRSG for conversion into superheated high pressure steam, intermediate pressure steam, and low pressure steam by indirect heat exchange with the gas turbine exhaust gas passing therethrough. Thus, the output steam of Jahnke et al.'s heat exchanger is not used to cool any device, but rather it passes through high temperature exhaust gas of a gas turbine so that the output steam of the heat exchanger is heated to a higher temperature. Why would one skilled in the art heat the output steam of Jahnke et al.'s heat exchanger and then provide it to another device in order to cool that device, when one skilled in the art would realize that it would be better to use the 100 F to 250 F steam from the heat exchanger to accomplish that purpose? It is Applicants' view that Jahnke et al. does not contemplate using the output steam from his heat exchanger to cool a high temperature component of his system, and one skilled in the art would not do so.

While Rice discloses the use of steam to cool a steam turbine outer shell (which is at a very high temperature), the steam that is used to perform this cooling is steam extracted from another portion of the power turbine system. Thus, in Rice, everything takes place within his power turbine system, which is not an IGCC plant. Accordingly, Applicant's do not see how the combined teachings of Jahnke et al. and Rice are pertinent to the claimed invention, since: a) Jahnke et al. discloses that steam from a heat exchanger is heated to a higher temperature and thus one skilled in the art would not use that steam to cool another component, and b) Rice discloses the use of steam obtained from one portion of a component (steam turbine) to cool another portion of that same component (outer shell of the steam turbine).

With respect to column 12, lines 28-40 of Jahnke et al., this section of Jahnke et al. discloses that steam from a heat exchanger is super-heated to a higher temperature and then applied to other components of the system. Thus, just like column 9, lines 11-20, column 12, lines 28-40 of Jahnke et al. does not teach or suggest the use of steam output from a heat exchanger being used to cool another component of the system, since otherwise why would Jahnke et al. teach the heating of that steam prior to applying it to cool another portion of his system?

The Office Action also refers to column 11, lines 27-31 of Rice, but this portion of Rice merely discloses that reheated steam is used to heat (NOT COOL) a combustor and a power turbine.

Also, with respect to the independent claims, neither Jahnke nor any of the other cited art of record teaches the providing of two sources of heat to a steam turbine, whereby one of those sources of heat is steam previously used to cool a gas turbine, and where the other of those sources of heat is steam output by a heat recovery system to the steam turbine.

Accordingly, all of the presently pending independent claims are patentable over the cited art of record.

With respect to claim 50, that claim recites that the providing means only provides the high-pressure air to the high-temperature section of the gas turbine when steam is not generated by the heat exchanger in the coal gasification system. Page 19 of the Office Action discusses claim 50, and it relies on Perkins et al. for allegedly teaching this feature. The Office Action state that the claim limitation of "only provides" is an operational condition which is not given patentable weight in an apparatus claim, when all structural limitations are met by the prior art. Applicants do not agree with the Examiner's position, especially since this feature is written as a mean-plus-function limitation, and thus the Examiner should give this "apparatus feature" patentable weight. However, in the interest of expediting prosecution, claim 50 has been amended to recite a control means for determining when steam is being generated by the heat exchanger, and wherein the providing means only provides the high-pressure air from the air compressor to the gas turbine when the control means indicates that no steam is being generated by the heat exchanger. The combined teachings of the cited art of record do not teach or suggest such features as recited in claim 50.

Also, column 2, lines 53-61 of Perkins et al. describes that a high pressure compressor outputs air, which passes through a heat exchanger, and then which is used as combustion supporting air in a combustor 10. Newly added claim 51 recites that the high-pressure air from the air compressor is output directly to the high-temperature section of the gas turbine, which is a feature clearly lacking in Perkins et al. and in the other cited art of record.

Accordingly, since there are no other objections or rejections raised in the Office Action, Applicants believe that the present application is now in condition for allowance, and an early indication of allowance is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

September 2, 2003
Date

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